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IS 10803 (1984) : Method of sampling and preparation of weld pad for chemical analysis of weld metal from covered electrodes for manual metal arc welding [MTD 11: Welding General]

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Indian Standard

**METHOD OF SAMPLING AND PREPARATION
OF WELD PAD FOR CHEMICAL ANALYSIS
OF WELD METAL FROM COVERED
ELECTRODES FOR MANUAL
METAL ARC WELDING**

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**INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Indian Standard

METHOD OF SAMPLING AND PREPARATION OF WELD PAD FOR CHEMICAL ANALYSIS OF WELD METAL FROM COVERED ELECTRODES FOR MANUAL METAL ARC WELDING

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Indian Standard

METHOD OF SAMPLING AND PREPARATION OF WELD PAD FOR CHEMICAL ANALYSIS OF WELD METAL FROM COVERED ELECTRODES FOR MANUAL METAL ARC WELDING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 2 January 1984, after the draft finalized by the Welding General Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard is meant to be a guide specifying a uniform method of preparing the weld pad for chemical analysis of weld metal from covered electrodes for manual metal arc welding.

0.3 In the preparation of this standard assistance has been derived from ISO/DIS 6847 'Manual metal arc deposition of a weld metal pad for chemical analysis', issued by the International Organization for Standardization.

0.4 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard describes the method of preparation of weld pad obtained by deposition from electrodes for manual metal arc welding and specifies the method of taking out chips for chemical analysis purposes. This standard does not cover estimation of gases in weld metal.

1.2 **Electrodes Size and Type** — This standard applies to manual arc welding electrodes of all ferrous metals and nickel and nickel-base alloys in the sizes from 1.6 mm to 6.3 mm diameter.

*Rules for rounding off numerical values (revised).

2. BACKING PLATE FOR PADS

2.1 Parent Metal — The parent metal used as backing plate shall be of mild steel conforming to IS : 226-1975*, IS : 2002-1962† or IS : 2062-1980‡.

2.2 Dimensions — The dimensions of the backing plate shall not be less than the following:

<i>Electrode Size, mm</i>	<i>Backing Plate Size, mm</i>
1.6, 2.0, 2.5, 3.15	55 × 55 × 10
4.0, 5.0, 6.3	65 × 65 × 10

2.3 Surface Condition — The surface of the plate shall be thoroughly cleaned by brushing and grinding to remove all grease, paint, rust, scale and other contaminants.

3. METHOD OF WELDING

3.1 Current and Polarity — The deposition shall be carried out using the type of current (ac/dc) and polarity (+ve/-ve) as indicated by the manufacturer of the electrodes. If the manufacturer leaves the choice of type of current to the user, the user shall carry out the deposition using the current of his choice.

3.2 Welding Position — The weld deposition shall be carried out in the flat position.

3.3 Welding Equipment — The welding equipment shall have drooping voltage characteristics in conformity with the recommendations of the electrode manufacturer. In case of alternating current, the welding equipment should exhibit a minimum open circuit voltage at least equal to the one recommended by the electrode manufacturer.

3.4 Drying of Electrodes — Prior to welding, the electrodes shall be properly dried as per recommendation of the electrode manufacturer. In case of low hydrogen electrodes, extra care shall be taken in baking and removing moisture from the electrode covering.

3.5 Fusion of the Electrode

3.5.1 The electrode shall be fused completely leaving the usual length of stub which would vary between 30 to 50 mm depending on size and type of electrodes.

*Structural steel (standard quality) (fifth revision).

†Steel plate for boilers.

‡Structural steel (fusion welding quality) (second revision).

3.5.2 The arc length shall be kept as short as possible. A stable arc shall be maintained.

3.5.3 Deposition should be carried out at normal speed without weaving. The width of each weld bead shall be 1.5 to 2.5 times the diameter of the corewire of the electrodes.

3.5.4 The current intensity shall be equal to the mean value recommended for welding in the flat position or, if not specified, it shall correspond to 70 percent of the maximum current value indicated by the manufacturer.

3.5.5 Method of Building Up and Cooling of the Deposit

3.5.5.1 Weld layers shall be built up in such a way that the beads of the next layer shall be laid in a direction opposite to the previous layer (see also 3.5.5.4). The width of the runs shall be as indicated in 3.5.3.

3.5.5.2 The backing plate, during welding, shall be kept on the welding table without keeping any insulating materials underneath.

3.5.5.3 After each pass the deposited metal shall be cooled by immersion in 10 litres of water for about 30 seconds, the depth of immersion being at least 10 cm.

3.5.5.4 The second and subsequent layers shall be deposited after adequate drying. After each cooling, the test piece shall be placed in front of the welder in the opposite direction in order that the ends of the runs in the previous layer coincide with the beginning of runs in the following layer.

4. DIMENSIONS OF WELD DEPOSIT

4.1 At least eight layers shall be deposited. The sampling will be done from upper three layers. The dimensions of the deposit shall be not less than those indicated below:

<i>Electrode Size</i> mm	<i>Dimensions of Deposit, Min</i> mm
1.6, 2.0, 2.5	30 × 30 × 13
3.15, 4.0, 5.0	40 × 40 × 16
6.3	55 × 55 × 20

5. REMOVAL OF CHIPS FOR CHEMICAL ANALYSIS

5.1 The top most layer of the deposit, which is often contaminated and oxidised to some extent, shall be removed and discarded. The removal may be done by shaping, milling or grinding.

5.2 The chips for chemical analysis shall be removed by dry machining the layers indicated in Fig. 1. A minimum distance X from the surface of the backing plate shall be left out as shown below as it may contain diluted metal.

<i>Electrode Size</i>	<i>X</i>
mm	mm
1.6, 2.0, 2.5	8
3.15, 4.0, 5.0	10
6.3	12

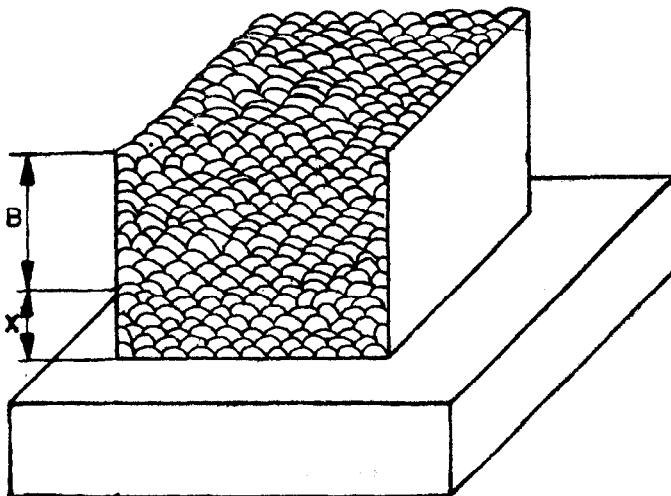


FIG. 1 WELD PAD FOR CHEMICAL ANALYSIS

5.3 If chemical analysis is carried out by spectrochemical method, the analysis should be performed at least on three spots (see Fig. 2) lying on a diagonal represented by the volume of metal, represented by the height B of the weld pad. Sample of suitable shape and size may be machined out for this purpose, having their test surface lying on the diagonal. An average of the three readings taken from these spots shall be reported.

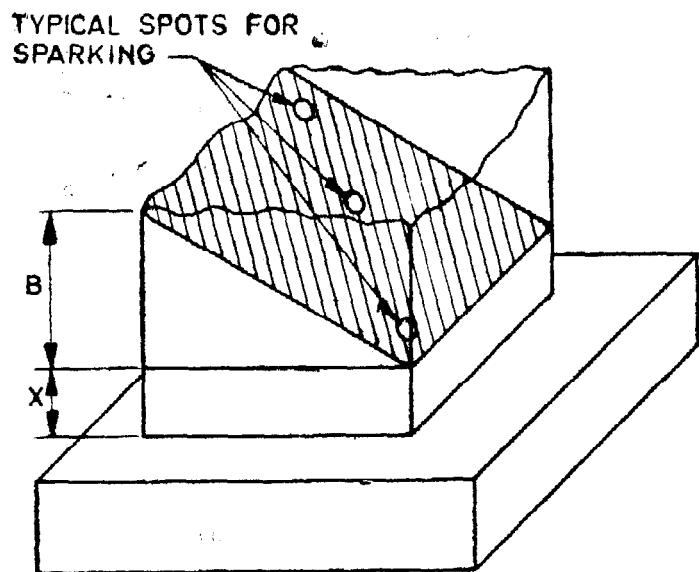


FIG. 2 METHOD OF SELECTION OF SPOTS FOR SPARKING

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IS 10803 : 1984 METHOD OF SAMPLING AND PREPARATION OF WELD
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ELECTRODES FOR MANUAL METAL ARC WELDING

(Page 4, clause 2.2) — Substitute the following for the existing:

Dimensions — The dimensions of the backing plate shall not be less than the following:

<i>Electrode Size, mm</i>	<i>Backing Plate Size, mm</i>
1.6, 2.0, 2.5, 3.15/3.2,	55 × 55 × 10-15 mm
4.0, 5.0, 6.3	65 × 65 × 10-15 mm

At least eight layers shall be deposited. The sampling will be done from at least 6.4 mm above original base metal:

<i>Electrode Size</i>	<i>Dimensions of Deposit, Min, mm</i>
1.6, 2.0, 2.5	30 × 30 × 13
3.15/3.2, 4.0, 5.0	40 × 40 × 16
6.30	40 × 40 × 20

(Page 5, clause 3.5.3) — Substitute the following for the existing:

‘Deposition should be carried out at a normal speed with minimum weaving. The width of each bead shall be 1.5 to 2.5 times the diameter of the core wire of the electrode, however, size of beads will vary according to the size of electrode and width of the weave.’

(Page 5, clause 3.5.5.4) — Add the following at the end:

‘The slag shall be removed after each pass.’

(MTD 11)

Reprography Unit, BIS, New Delhi, India